IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yoshifumi IIDA, et al. Group Art Unit: 1753

Application No. 09/987,413 Examiner: C. RoDee

Filed: December 14, 2001

For: TONER FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE, DEVELOPER, DEVELOPER UNIT, AND METHODS FOR FORMING AN IMAGE

DECLARATION UNDER 37 C.F.R. §1.132

Honorable Commissioner of Patents and Trademarks

Washington, D.C. 20231

Sir:

I, Yoshifumi IIDA, do declare and state as follows:

I graduated from Graduate School of Tokai University with a Master's Degree in Metallurgical Engineering in March 1993;

I joined Fuji Xerox Co., Ltd. in April 1993, and I have been engaged in the research and development of developers for developing an electrostatic latent image at Fuji Xerox's Takematsu Branch, Development Section;

I am a co-inventor of the subject matter disclosed and claimed in the above-identified application; and

I am familiar with the Office Action of July 16, 2003, and understand the Examiner's rejections therein.

This is a supplemental Declaration to the Declaration filed on November 17, 2003, in order to clarify the evaluation criteria.

The following additional comparative experiments were carried out by me or under my supervision in order to make the advantages of the subject matter more clear.

EXPERIMENTS

Preparation of Toner

In accordance with the procedures set forth in the Examples of the present specification, a white color toner of Example 1 was prepared. Also, another white color toner of Example 5 of the present invention was prepared and used in a two-layer constitution in which the white toner layer was superimposed on a black toner layer to form images.

Further, in accordance with the procedures described in Example 15 of U.S. Patent No. 4,985,327 (*Sakashita et al.*), a cyan toner was prepared. This color toner contained the colorant (cyan) in an amount that was the largest among the colorants used in the Examples of U.S. Patent No. 4,985,327. Images were formed using this cyan toner in a two-layer constitution in which the cyan toner layer was superimposed on a black toner layer.

Evaluation

A copy test was performed by forming a sample image in which TMA (Toner Mass per unit Area) was 0.7 mg/cm^2 on a full color OHP film (Manufactured by Fuji Xerox Co., Ltd.), and measuring the transmittance of the obtained sample image using a reflectance/transmittance meter HR100 (manufactured by Murakami Shikisai Gijyutsu Kenkyusho K.K.). The transmission density was obtained in accordance with the equation below, and the shielding property was evaluated based on the following evaluation criteria (as set forth at page 39, lines 25 - 29 of the present specification).

Shielding Property (Transmission Density) = Log (1/total transmittance)

Evaluation Criteria

Sample images that yielded 0.25 or higher for white and 1.30 or higher for black were evaluated as good. In the case of a two-layer constitution, sample images that yielded 1.6 or higher were evaluated as good. Those yielding values lower than specified were evaluated as poor.

Incidentally, the evaluation criteria for a two-layer constitution were as follows:

Using Xrite 341 (manufactured by Xrite Corp.), images were evaluated for shielding property by obtaining values measured at five points in the images and calculating an average thereof. When the OHP film on which images having holes with a diameter of 20 to 50 μm had been formed was irradiated with light from the back of the film, light was transmitted and was visible in the form of spots. This phenomenon is an image defect called "pin-hole". In sample images yielding 1.6 or lower, "pin-holes" in which light was visible as dots were found, and thus the used toner was insufficient in shielding property.

RESULTS

The results are summarized in Table A below.

TABLE A

		Toner Layer Constitution	Transmission Density (Shielding Property)
Present Invention	Example 1	White (One-layer)	0.31(◯)
	-	Black (One-layer)	1.45(◯)
	Example 5	Two-layer (white + black)	2.08(◯)
U.S. Patent No. 4,985,327	Example 15	Cyan (One-layer)	0.25(◯)
	-	Two-layer (Cyan + black)	1.55(×)

Note: Symbol "◯": good; Symbol "×": poor

The results shown in Table A indicate that the white color toner of the present invention exhibits excellent shielding property when used in a two-layer constitution in which the white toner layer is superimposed on the black toner layer.

The excellent results are attributed to the fact that the white color toner behaves in such a way to fill the holes ("pin-hole") present in the image formed, and accordingly the white color toner of the present invention shows high shielding property.

The toner of U.S. Patent No. 4,985,327 (*Sakashita et al.*) meets the criteria of the shielding property specified in the present invention when it is used in a one-layer constitution. However, as is clear from Table A above, when used in a two-layer constitution in which the cyan layer is superimposed on the black layer, the cyan toner of U.S. Patent No. 4,985,327 cannot shield the pin-hole in the underlying black layer due to low content of the cyan colorant. Consequently, the toner of U.S. Patent No. 4,985,327 has low shielding property when used in a two-layer constitution and cannot meet the criteria of the present invention.

In summary, the following were revealed. When used singly (in a one-layer constitution), the white color toner of the present invention and the cyan toner of U.S. Patent No. 4,985,327 provide almost similar results (values) in shielding property. However, when used in a two-layer constitution in which the white color toner or the cyan toner is superimposed on the black toner layer, the white color toner of the present invention provides excellent results in shielding property (higher transmission density) as compared to the toner of U.S. Patent No. 4,985,327.

CONCLUSION

As is apparent from the foregoing, a white color toner of the present invention has excellent shielding property and thereby can exhibit high contrast when used in a two-layer constitution. Accordingly, the white color toner of the present invention provides an unexpected and superior effect as compared to the toner of U.S. Patent No. 4,985,327 (*Sakashita et al.*)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: December 22, 2003

Yoshifumi Iida

Yoshifumi IIDA